FORM PCT 1390 REV. 5/93 U.S. DEPARTMENT OF COMMERCE PATENT AND TRADEMARK OFFICE

ATTORNEY'S DOCKET NO.
Berger et al PCT

TRANSMITTAL LETTER TO THE UNITED STATES DESIGNATED/ELECTED OFFICE (DO/EO/US) CONCERNING A FILING UNDER 35 U.S.C. 371

U.S. APPLICATION NO. (if known, see 37 CFR 1.5)
09/403557

INTERNATIONAL APPLICATION NO.	INTERNATIONAL FILING DATE	PRIORITY DATE CLAIMED
PCT/DE98/03385	16 November 1998	17 November 1997

TITLE OF INVENTION

COMPONENT FOR PRODUCING POLYMER MIXTURES BASED ON STARCH, AND PROCESS FOR PRODUCING THE COMPONENT

APPLICANT(S) FOR DE/EO/US
Werner BERGER ET AL

Applicant herewith submits to the United States Designated/Elected Office (DO/EO/US) the following items and other information:

1. _X_ This is a **FIRST** submission of items concerning a filing under 35 U.S.C. 371.
2. ___ This is a **SECOND** or **SUBSEQUENT** submission of items concerning a filing under 35 U.S.C. 371.
3. _X_ This is an express request to begin national examination procedures (35 U.S.C. 371 (f)) at any time rather than delay examination until the expiration of the applicable time limit set in 35 U.S.C. 371(b) and PCT Articles 22 and 39(1).
4. ___ A proper Demand for International Preliminary Examination was made by the 19th month from the earliest claimed priority date.
5. _X_ A copy of the International Application as filed (35 U.S.C. 371(c)(2)
   a. _X_ is transmitted herewith (required only if not transmitted by the International Bureau)
   b. ___ has been transmitted by the International Bureau.
   c. ___ is not required, as the application was filed in the United States Receiving Office (RO/US).
6. _X_ A translation of the International Application into English (35 U.S.C.371(C)(2)
7. ___ Amendments to the claims of the International Application under PCT Article 19 (35 U.S.C. 371(c)(3)).
   a. ___ are transmitted herewith (required only if not transmitted by the International Bureau).
   b. ___ have been transmitted by the International Bureau.
   c. ___ have not been made; however, the time limit for making such amendments has **NOT** expired.
   d. ___ have not been made and will not be made.
8. ___ A translation of the amendments to the claims under PCT Article 19 (35 U.S.C. 371(c)(3)).
9. _X_ An oath or declaration of the inventor(s) (35 U.S.C. 371(c)(4)).
10. ___ A translation of the annexes to the International Preliminary Examination Report under PCT Article 36 (35 U.S.C. 371(c)(5)).

Items 11. to 16. below concern other document(s) or information included:

11. ___ An Information Disclosure Statement under 37 CFR 1.97 and 1.98.
12. _X_ An assignment document for recording. A separate cover sheet in compliance with 37 CFR 3.28 and 3.31 is included.
13. ___ A **FIRST** preliminary amendment.
    ___ A **SECOND** or **SUBSEQUENT** preliminary amendment.
14. ___ A substitute specification
15. ___ A change of power of attorney and/or address letter.
16. _X_ Other items or information:
    Small Entity Declaration
    Petition for Revival of Unintentionally Abandoned Application

420 Rec'd PCT/PTO 25 OCT 1999

APPLICATION NO. (if known, see 37 CFR 1 5)	INTERNATIONAL APPLICATION NO	ATTORNEY'S DOCKET NO
09/403557	PCT/DE98/03385	Berger et al PCT

17. X The following fees are submitted:	CALCULATIONS	PTO USE ONLY
Basic National Fee (37 CFR 1.492(a)(1)-(5)):		
Search Report has been prepared by the EPO or JPO.....$840.00		
International preliminary examination fee paid to USPTO (37 CFR 1.492) $670.00		
Neither international preliminary examination fee paid (37 CFR 1.82) nor international search fee (37 CFR 1.445(a)(2)) paid to USPTO.....$ 970.00		
International preliminary examination fee paid to USPTO (37 CFR 1.482) and all claims satisfied provisions of PCT Article 33(2)-(4).....		
ENTER APPROPRIATE BASIC FEE AMOUNT =	$ 840.00	
Surcharge of $130.00 for furnishing the oath or declaration later than X 20 ___ 30 months from the earliest claimed priority date (37 CFR 1.492(e)).	$ 130.00	

Claims	Number Filed	Number Extra	Rate		
Total Claims	17 - 20 =	2	X $18.00	$	
Independent Claims	2 - 3 =	0	X $78.00	$	
Multiple dependent claim(s) (if applicable)			+ $260.00	$	
TOTAL OF ABOVE CALCULATIONS =				$ 970.00	
Reduction by 1/2 for filing by small entity, if applicable. Verified Small Entity statement must also be filed (Note 37 CFR 1.9, 1.27, 1.28).				$ 485.00	
SUBTOTAL =				$ 485.00	
Processing fee of $130.00 for furnishing the English translation later than X 20 ___ 30 months from the earliest claimed priority date (37 CFR 1.492(f)). +				$ 130.00	
TOTAL NATIONAL FEE =				$ 615.00	
Fee for recording the enclosed assignment (37 CFR 1.21(h)). The assignment must be accompanied by an appropriate cover sheet (37 CFR 3.28, 3.31). $40.00 per property +				$	
TOTAL FEES ENCLOSED =				$ 615.00	
				Amount to be: refunded	$
				charged	$

a. X A check in the amount of $ 615.00 to cover the above fees is enclosed.

b. ___ Please charge my Deposit Account No. 03-2468 in the amount of $_____ to cover the above fees. A duplicate copy of this sheet is enclosed.

c. X The Commissioner is hereby authorized to charge any additional fees which maybe required, or credit any overpayment, to Deposit Account No. 03-2468. A duplicate copy of this sheet is enclosed.

NOTE: Where an appropriate time limit under 37 CFR 1.494 or 1.495 has not been met, a petition to revive (37 CFR 1.137(a) or (b)) must be filed and granted to restore the application to pending status.

SEND ALL CORRESPONDENCE TO:

COLLARD & ROE, P.C.
1077 Northern Boulevard
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Signature

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Date of October 25, 1999

I hereby certify that this paper or fee is being deposited with the United States Postal Service "Express Mail Post Office to Addressee" service under 37 CFR 1.10, on the date indicated above, and is addressed to the Assistant Commissioner for Patents, Washington, D.C. 20231

Ingrid Mittendorf

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICANT OR PATENTEE: W. BERGER ET AL
SERIAL OR PATENT NO.: PCT/DE98/03385
FILED OR ISSUED: NOVEMBER 16, 1998
GROUP:
TITLE: **COMPONENT FOR PRODUCING POLYMER MIXTURES BASED ON STARCH, AND PROCESS FOR PRODUCING THE COMPONENT**

SMALL ENTITY DECLARATION

[ ] FOR INDEPENDENT INVENTOR(S)

As a below-named inventor, I hereby declare that I am an independent inventor who (1) has not assigned, granted, conveyed, or licensed, and (2) is under no obligation under contract or law, to assign, grant, convey, or license, any rights in the invention, to any person who could not likewise be classified as an independent inventor if that person had made the invention, or to any concern which would not qualify as a small business concern or a nonprofit organization, as defined in 37 CFR 1.9(c).

[x] FOR SMALL BUSINESS CONCERN

I hereby declare that BIOP Biopolymer GmbH is a business concern which qualifies as a small business concern as defined in §1.9(d) - namely, (1) whose number of employees, including those of its affiliates, does not exceed 500 persons; and (2) which has not assigned, granted, conveyed, or licensed, and is under no obligation under contract or law to assign, grant, convey, or license, any rights in the invention to any person who could not be classified as an independent inventor if that person had made the invention, or to any concern which would not qualify as a small business concern or a nonprofit organization under this section; and that the exclusive rights to the invention have been conveyed to and remain with the above-identified small business concern.

I further declare that all statements made herein of my own knowledge are true and all statements made on information and belief are believed to be true; and further, that these statements were made with the knowledge that willful, false statements and the like, so made, are punishable by fine or imprisonment, or both, under Section 1001 of Title 18 of the United States Code, and that such willful, false statements may jeopardize the validity of the patent application or any patent issuing thereon.

Each of the undersigned hereby grants the firm of **COLLARD & ROE, P.C.**, 1077 Northern Boulevard, Roslyn, New York 11576, U.S.A., the power to insert in this Small Entity Declaration any further identification which may be necessary or desirable to comply with the rules of the U.S. Patent and Trademark Office for filing and acceptance of this Declaration.

INVENTOR(S):

_____

Name:

Date:

_____

Name:

Date:

SMALL BUSINESS CONCERN:

By: Werner Berger Werner Berger

Name: Sub Lutz Jeromin

Title: Managers

Date: Oct. 11, 1999

COMPONENT FOR PRODUCING POLYMER MIXTURES BASED ON STARCH, AND PROCESS FOR PRODUCING THE COMPONENT

The invention relates to a component consisting of polyvinyl acetate and alkali water glass for producing thermoplastically deformable, biodegradable and bright polymer mixtures based on starch, with good dimensional stability in water, which can be applied for the manufacture of sheet material, semi-finished and finished products, for example for packagings, containers and articles required in horticultural nurseries, in particular growing or cultivation aids, as well as in other fields of application. The invention, furthermore, relates to a process for producing said component.

Numerous methods have become known in the last few years for producing and shaping thermoplastic starch (TPS) either alone or in the form of a polymer mixture or polymer melt or polymer blend (in the following referred to as a polymer mixture). Said methods were developed with the goal to open up new or expanded fields of application for regrowing raw materials. The basis of all inventions that have become

known heretofore is the finding that the grainy structure of native starch can be changed into thermoplastic material first with defined proportions of water and/or lower polyfunctional alcohols such as ethylene glycol, propylene glycol, glycerol, 1,3-butane-diol, diglyceride, and the respective ethers, but also with compounds such as dimethyl sulfoxide, dimethyl formamide, dimethyl urea, dimethyl acetamide, and/or other additives, through thermomechanical breakdown with the help of conventional extruders; and that such materials then can be molded.

The useful value of the extrudate and of the products produced from the latter is low. In particular, the material is highly hydrophilic.

More recent proposals are dealing with the admixture of synthetically obtained waterproof polymers such as, for example polyethylene, polypropylene, polycaprolactone, as mixing components for starch. In this connection, however, the problem arises that the compatibility between the polymer components is inadequate, and that the biodegradability and also the cost structure become unfavorable.

The prior art is extensively documented in the relevant literature. Reference is made in this connection, for example to the publication by R.F.T. Stepto et al "Injection Molding of Natural Hydrophilic Polymers in the Presence of Water", Chimia 41 (1987), No. 3, pp. 76-81, and the literature cited there, as well as, for example to patents DE 4116404; EP 0327505; DE 4038732; US 5,106,890; DE 4117628; WO 94/04600; DE 4209095; DE 4122212, EP 0404723; and EP 407350.

In DE 40 38 732, the starch plasticized with water and glycerol is processed in the extruder to a polymer mixture predominantly with polyvinyl acetate. The extrudate exhibits superior resistance to water as compared to TPS. With higher amounts of starch components, the extrudate or the bottles produced therefrom take on a yellowish to brownish color. This limits the starch component to below 50%.

A slightly acid to neutral component consisting of polyvinyl acetate and water glass has already been proposed (DE 195 33 800) in which a polymer mixture of starch and a hydrophobic polymer, e.g. polyvinyl acetate, can be

extruded. The component is produced from water glass and polyvinyl acetate as well as, if need be, further acid components for adjusting the pH, by the extrusion process with intensive mixing. It has been found that even only minor additions of said component lead to a significant qualitative improvement of the extrudate and of the products manufactured from the latter. As compared to the prior art, native starch can be used in considerably greater amounts without or with only minor discoloration and while maintaining or enhancing the dimensional stability in water. The component obviously contributes to the fact that the two phases, which are not compatible in mixture per se, render the hydrophilic thermoplastic starch and the hydrophobic polymer miscible to a certain degree.

Further tests have shown that the quality of the final products has to be improved even further with respect to dimensional stability in water and strength. In particular, it has not been possible to manufacture thin sheet materials with a thickness of below about 300 µm.

Starting with the goal to make even more use of regrowing raw materials for the economical manufacture of products that are compatible with the environment, the present invention developed based on the problem of proposing a component with which it is possible to extrude from thermoplastic starch and a hydrophobic polymer, for example polyvinyl acetate, qualitatively higher valued, thermoplastically moldable and biodegradable polymer mixtures, as well as on the problem of proposing a process for producing said component from polyvinyl acetate and alkali water glass.

The component is obtained according to the invention by hydrolizing and saponifying the polyvinyl acetate in the batch process in the presence of catalytic additions of low-molecular organic mono-, di- and trihydroxyl compounds (e.g. methanol, ethanol, ethylene glycol, glycerol) with a continuous addition of basically reacting compounds and the alkali silicate.

The component contains organosilicates of high homogeneity and fineness consisting of partially saponified polyvinyl acetate and alkali silicate solution, additional

reaction products produced in situ, as well as residues of the catalyst employed in the production of said component.

Characteristic of the way in which the reaction is controlled is that the polyvinyl acetate is loaded first in an about 50% suspension with the catalyst, and that the basic compounds are added under thorough mixing before the alkali silicate solution is added, or together with the latter.

It has been found that it is possible with said component to extrude polymer mixtures with high starch proportions analogous to DE 195 33 800. It is shown in the examples of execution in greater detail that the products manufactured from said polymer mixtures have a distinctly higher quality with respect to a number of parameters. In particular, it is possible already now to produce sheets with a thickness of less than 100 µm.

Various modifications have already been found.

Especially if the polyvinyl is presaponified with calcium hydroxide, a component is formed with which

biodegradable polymer mixtures of high strength can be produced. The best values to date were obtained with calcium hydroxide and sodium disilicate (instead of water glass).

The quality of the final products is enhanced even if native starch and vinylacetate or polyfunctional silane (e.g. Dynasilane GLYMO of the Hüls Company) are added in the manufacture of the component in small amounts.

The component is solid at room temperature and a structured liquid at above 40°C. Following removal from the mixer, excess water can be removed by centrifuging. A residual moisture of 35% to 40% usually remains in the product. The catalyst employed is contained in said residual moisture about proportionally to the amounts of catalyst and liquid used.

The invention is explained in greater detail in the following with the help of a number of exemplified embodiments.

The various components were produced in a discontinuously operating solid/liquid mixer of the firm Gebrüder Lödige Maschinenbau GmbH. The mixer is equipped with centrifuging gear controllable via the speed (about 350 rpm max.), and with a blade head operating at constant speed. The mixture was heated via the twin jacket of the mixer by means of a pressure-superposed tempering system, or with direct steam.

After the reaction temperature of 120° to 140°C was reached, reaction times of from 1 to 2 hours were required.

The following feed stock was charged: 55% polyvinyl acetate suspension; 99.5% glycerol; 40% Na water glass 37/40; as well as NaOH and/or $Ca(OH)_2$.

For determining the quality, polymer mixtures based on polyvinyl acetate and starch each containing 10% of the respective component used were extruded analogous to DE 195 33 800, and test specimens and flat sheets were produced from said polymer mixtures. The mass ratio of starch to polyvinyl acetate amounted to 3:1 in all tests without change.

The degree of swelling (SW in %) and the solubility (SO in %) were determined on the test specimens, which were stored in water at room temperature for a period of 24 hours. In this connection, the degree of swelling corresponds with the quotient based on the mass difference of undried swollen test specimen (m_{sw}) and the same dried test specimen prior to swelling (m_A) relative to the starting mass of the dry test specimen prior to swelling (m_A):

$$SW = \frac{m_{sw} - m_A}{m_A} \quad \text{(in \%)}.$$

The solubility is calculated based on the mass of the dry starting specimen (m_A), reduced by the mass of the watered dried specimen (m_w) and related to the mass of the dried starting specimen:

$$SO = \frac{m_A - m_w}{m_A} \quad \text{(in \%)}.$$

The tensile strength (σ in MPa), elongation (ε in %) and the E-modulus (in MPa) were determined on test specimens in the form of shoulder rods (L = 75 mm; $W_{shoulder}$ = 13 mm; W_{bridge} = 4 mm). Said rods were punched out at 130°C

from extruded flat sheets, and stored over 24 hours at 50% relative air humidity. The test speed came to 200 mm/min; the measurements were carried out in accordance with ISO 527.

The numerical values specified in the table (see below) represent average values based on several comparable measurements.

<u>Example 1</u>

1600 g polyvinyl acetate suspension and 120 g glycerol was loaded by weight in an unheated laboratory mixer and, under stirring with the centrifuging gear (n 300-350 rpm), heated to the reaction temperature of 140°C. 900 g of the sodium water glass solution, enriched with 171 g sodium hydroxide, was continuously metered into the hot reaction medium via a micro-dosing pump against the pressure existing in the interior of the mixer, said pressure corresponding with the temperature and the water content. The dosing rate was selected in such a way that the desired reactions were substantially completed when the dosing was stopped. In the present example, the metering and reaction time

amounted to 2 hours. In addition to the centrifuging gear, the blade head was switched on throughout the entire metering time as well. Following metering of the sodium glass water solution, flushing was carried out with 0.25 N. soda lye in order to feed the rest of the water glass into the reaction mixture.

The properties of the extruded polymer mixture are specified in the following table under Example 1.

For comparison purposes, a component was prepared analogous to DE 195 33 800, but also by the batch process (thus under superior conditions). The properties of the extruded polymer mixture are contained in the following table under Example 0.

It is obvious that the values of the extruded polymer mixture prepared with the component produced according to the invention are enhanced. Most of all, however, it was possible to produce substantially thinner sheets than heretofore.

Example 2

Same as Example 1; however, instead of the amount of sodium hydroxide added to the sodium water glass in 1, an equimolar amount of calcium hydroxide was added to the reaction batch. Following heating, the water glass was metered into the mixture with the micro-dosing pump and the reaction was completed according to the procedure described in Example 1.

Example 3

The calcium hydroxide is added by weight to the polyvinyl acetate/glycerol mixture and intimately homogenized. The preparation is subsequently heated to the reaction temperature and maintained at said temperature for 1 hour. Metering of the sodium water glass was subsequently carried out as in Examples 1 and 2.

The degree of presaponification can be varied by varying the reaction time and reaction temperature as well as the concentration of the basic starting substances.

The resistance to water of the polymer mixture is enhanced by using calcium hydroxide and particularly by

varifying the presaponification (see table, Examples 2 and 3).

Example 4

5% native potato starch based on the weighed amount of polyvinyl acetate suspension was added to the reaction batch prior to saponification, and reacted as described in Example 1. A certain deterioration occurred as compared to the values obtained in Example 1 (table, Example 4).

Example 5

5% potato starch and 0.5% vinylacetate based on the weighed amount of the polyvinyl acetate suspension was added to the reacted reaction product obtained from polyvinyl acetate, sodium hydroxide and sodium water glass, and an ester interchange was carried out for 1 hour at 40°C. The product properties showed a substantial improvement (table; Example 5).

Example 6

Adding 5% of a polyfunctional silane (Dynasilane GLYMO, Hüls Company) based on the mass of silicate

introduced into the component by the sodium water glass has a positive effect on the properties of the extruded compound as well (see table; Example 6). Therefore, the weighed portion of silane was admixed to the finished component at a temperature of below 100°C. The mass was heated to 120°C and stirred for 20 minutes at said temperature.

Example 7

A further possibility of influencing the spectrum of the properties of extruded starch/polyvinyl acetate mixtures becomes accessible through the synthesis of a component consisting of polyvinyl acetate suspension partially saponified with calcium hydroxide, and sodium disilicate. The composition of the reaction batch is selected in this connection in such a way that it corresponds with the degree of saponification and the silicate content of the component according to Example 1. The polyvinyl acetate suspension, the calcium hydroxide and the sodium disilicate are mixed by weight, heated to the reaction temperature, and maintained at said temperature over a period of time (2 hours) conforming to the metering of the water glass (table; Example 7).

Table: Property values of the polymer mixtures extruded with the different components (Examples 1 to 7) as defined by the invention, and with the comparative component (Example 0).

Example	Components	SW (%)	SO (%)	σ (MPa)	ε (%)	E-modulus (MPa)
0	Recipe according to DE 195 33 800	142	20	8.0	80	76
1	NaOH dissolved in sodium water glass solution	113	16	10.9	74	88
2	$Ca(OH)_2$, without pre-saponification	95	17	9.8	91	126
3	$Ca(OH)_2$ with pre-saponification	90	16	10.5	77	155
4	with potato starch	129	21	6.7	118	23
5	with potato starch and vinyl acetate	105	14	12.6	62	293
6	with dynasilane GLYMO	106	15	13.4	75	216
7	with $Ca(OH)_2$ and sodium disilicate	87	15	15.4	56	464

CLAIMS

1. A component for producing polymer mixtures from thermoplasticized starch and a hydrophobic polymer, e.g. polyvinyl acetate, characterized in that the component contains organosilicates with a largely homogeneous structure consisting of partially saponified polyvinyl acetate and alkali silicate solution, further reaction products prepared in situ, and residues of the catalyst employed in its preparation.

2. A process for producing a component consisting of polyvinyl acetate and alkali silicate such as, in particular alkali water glasssuch process being carried out with intensive thorough mixing and shearing, elevated temperature and increased pressure, for producing polymer mixtures from thermoplasticized starch and a hydrophobic polyer such as, in particular polyvinyl acetate, characterized in that the polyvinyl acetate is hydrolized and saponified in the presence of a catalyst with continuous addition of basically reacting compounds and of the alkali silicate.

3. The process according to claim 2, characterized in that the polyvinyl acetate is presaponified with basically

reacting compounds up to a degree of hydrolysis of 10% to 40%, preferably 20% to 30%, and subsequently finally saponified to a degree of hydrolysis of between 50% and 100%, preferably between 60% and 90%, preferably 70% to 80%.

4. The process according to claim 2, characterized in that a slightly alkaline organosilicate with a pH of about 7 to 8.5 is built up from the polyvinyl acetate and the water glass, starting with a pH of 9 to 10.

5. The process according to claim 2, characterized in that a hydroxide is added together with the alkaline water glass or before the latter is added.

6. The process according to claim 5, characterized in that calcium hydroxide is added to the polyvinyl acetate until a degree of saponification of between 10% and 40%, preferably of 20% to 30% has been reached.

7. The process according to claim 2, characterized in that as catalyst, low-molecular hydroxy compounds such as low-molecular alcohols (methanol, ethanol) and/or polyhydroxyl

compounds of the type ethylene glycol, diethylene glycol, triethylene glycol or glycerol are added individually or in mixture.

8. The process according to claim 2, characterized in that the totality of the catalyst compounds added does not exceed an amount of 0.5% to 20%, preferably 5% to 17%, particularly 10% to 15% based on the mass of the polyvinyl acetate.

9. The process according to claim 8, characterized in that in the batch process, polyvinyl acetate is loaded first in the form of an aqueous suspension, heated to the reaction temperature of 100°C to 160°C, preferably 120° to 150°C, preferably 140°; the basically reacting compound is metered in continuously for presaponification; and the alkaline water glass solution is metered in at reaction temperature after the desired degree of saponification has been reached.

10. The process according to claim 2, characterized in that the mixing ratio of polyvinyl acetate to alkali silicate expressed in mass proportions of the solid material is in the range of 50 : 50 to 80 : 80, preferably 65 : 35 to 75 : 25.

11. The process according to claim 2, characterized in that instead of the alkali silicate solution, sodium disilicate and a hydroxide are used at least partially.

12. The process according to claim 2, characterized in that one or a plurality of polyfunctional silanes are added to the reaction batch or to the component.

13. The process according to claim 12, characterized in that the silane mass proportion amounts to 3 to 15% of the amount of silane introduced with the alkali silicate solution.

14. The process according to claim 2, characterized in that native starch is added to the reaction batch or to the component.

15. The process according to claim 14, characterized in that 5 to 15% native starch is added based on the mass of the polyvinyl acetate.

16. The process according to claim 14, characterized in that vinyl acetate is added together with the starch.

17. The process according to claim 16, characterized in that 0.5 to 1.5% vinyl acetate is added based on he mass of the polyvinyl acetate.

ABSTRACT

The invention relates to a component for producing thermoplastically moldable, biodegradable and bright polymer mixtures based on starch, with good dimensional stability in water. The dimensional stability in water and the biodegradability of said component are adjustable and the component can be used for producing sheet materials, semi-finished or finished products, for example for packagings,containers, articles required in horticultural nurseries, and for other purposes. The invention, furthermore, relates to a process for producing the component from polyvinyl acetate and alkali silicate. A suspension of polyvinyl acetate is hydrolized and saponified in the batch process in the presence of catalytic additions such as, in particular glycerol, by adding the alkali silicate and hydroxides at high temperatures. Organosilicates of high homogeneity and fineness are formed. Additions of said component in small amounts have a positive effect on the phase compatibility of the hydrophilic starch and a hydrophobic polymer such as polyvinyl acetate in the course of preparation of the blend in the extruder. The properties of the extruded products are substantially enhanced.

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY
(Includes Reference to PCT International Applications)

ATTORNEY'S DOCKET NUMBER
BERGER ET AL PCT

As a below named inventor, I hereby declare that:

My residence, post office address and citizenship are as stated below next to my name,

I believe I am the original, first and sole inventor (if only one name is listed below) or an original, first and joint inventor (if plural names are listed below) of the subject matter which is claimed and for which a patent is sought on the invention entitled:

COMPONENT FOR PRODUCING POLYMER MIXTURES BASED ON STARCH, AND PROCESS FOR PRODUCING THE COMPONENT

the specification of which (check only one item below):

[ ] is attached hereto.

[ ] was filed as United States application

Serial No. _____

on _____,

and was amended

on _____ (if applicable).

[x] was filed as PCT international application

Number PCT/DE98/03385

on November 16, 1998,

and was amended under PCT Article 19

on _____ (if applicable).

I hereby state that I have reviewed and understand the contents of the above-identified specification, including the claims, as amended by any amendment referred to above.

I acknowledge the duty to disclose information which is material to the examination of this application in accordance with Title 37, Code of Federal Regulations, §1.56(a).

I hereby claim foreign priority benefits under Title 35, United States Code, §119 of any foreign application(s) for patent or inventor's certificate or of any PCT international application(s) designating at least one country other than the United States of America listed below and have also identified below any foreign application(s) for patent or inventor's certificate or any PCT international application(s) designating at least one country other than the United States of America filed by me on the same subject matter having a filing date before that of the application(s) of which priority is claimed:

PRIOR FOREIGN/PCT APPLICATION(S) AND ANY PRIORITY CLAIMS UNDER 35 U.S.C. 119:

COUNTRY (if PCT, indicate "PCT")	APPLICATION NUMBER	DATE OF FILING (day, month, year)	PRIORITY CLAIMED UNDER 35 USC 119
Germany	197 50 846.4	17 November, 1997	[x] YES [ ] NO
			[ ] YES [ ] NO
			[ ] YES [ ] NO
			[ ] YES [ ] NO
			[ ] YES [ ] NO

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (Includes Reference to PCT International Applications)	ATTORNEY'S DOCKET NUMBER BERGER ET AL PCT

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclose in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		STATUS *(Check One)*		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S					
PCT APPLICATION NO.	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED *(if any)*			

5 POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(List name and registration numbers):*

ALLISON C. COLLARD, Registration No. 22,532; WILLIAM C. COLLARD, Registration No. 38,411
EDWARD R. FREEDMAN, Registration No. 26,048; CHRISTOPHER B. GARVEY Registration No. 31,015
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2 00	FULL NAME OF INVENTOR	FAMILY NAME: BERGER	FIRST GIVEN NAME: Werner	SECOND GIVEN NAME:
0	RESIDENCE & CITIZENSHIP	CITY: Dresden	STATE OR FOREIGN COUNTRY: Germany DEX	COUNTRY OF CITIZENSHIP: Germany
1	POST OFFICE ADDRESS	POST OFFICE ADDRESS: Caspar-David-Friedrich-Str. 38	CITY: D-01217 Dresden	STATE & ZIP CODE/COUNTRY: Germany
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I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203
Werner Berger	Lutz Jeromin	Uta Mierau
DATE 11.10.99	DATE 11th Oct. 1999	DATE 11th Oct. 1999

COMBINED DECLARATION FOR PATENT APPLICATION AND POWER OF ATTORNEY (Includes Reference to PCT International Applications)	ATTORNEY'S DOCKET NUMBER **BERGER ET AL PCT**

I hereby claim the benefit under Title 35, United States Code, §120 of any United States application(s) or PCT international application(s) designating the United States of America that is/are listed below and, insofar as the subject matter of each of the claims of this application is not disclose in that/those prior application(s) in the manner provided by the first paragraph of Title 35, United States Code, §112, I acknowledge the duty to disclose material information as defined in Title 37, Code of Federal Regulations, §1.56(a) which occurred between the filing date of the prior application(s) and the national or PCT international filing date of this application:

PRIOR U.S. APPLICATIONS OR PCT INTERNATIONAL APPLICATIONS DESIGNATING THE U.S. FOR BENEFIT UNDER 35 U.S.C. 120:

U.S. APPLICATIONS		STATUS *(Check One)*		
U.S. APPLICATION NUMBER	U.S. FILING DATE	PATENTED	PENDING	ABANDONED

PCT APPLICATIONS DESIGNATING THE U.S.					
PCT APPLICATION NO	PCT FILING DATE	U.S. SERIAL NUMBERS ASSIGNED *(if any)*			

POWER OF ATTORNEY: As a named inventor, I hereby appoint the following attorney(s) and/or agent(s) to prosecute this application and transact all business in the Patent and Trademark Office connected therewith. *(List name and registration numbers):*

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2	FULL NAME OF INVENTOR	FAMILY NAME	FIRST GIVEN NAME	SECOND GIVEN NAME
0	RESIDENCE & CITIZENSHIP	CITY	STATE OR FOREIGN COUNTRY	COUNTRY OF CITIZENSHIP
6	POST OFFICE ADDRESS	POST OFFICE ADDRESS	CITY	STATE & ZIP CODE/COUNTRY

I hereby declare that all statements made herein of my own knowledge are true and that all statements made on information and belief are believed to be true; and further that these statements were made with the knowledge that willful false statements and the like so made are punishable by fine or imprisonment, or both, under section 1001 of Title 18 of the United States Code, and that such willful false statements may jeopardize the validity of the application or any patent issuing thereon.

SIGNATURE OF INVENTOR 201	SIGNATURE OF INVENTOR 202	SIGNATURE OF INVENTOR 203
DATE: 11th Oct. 1999	DATE	DATE